Central file

CC V-1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: MAY 09 1988

SUBJECT: Plant Inspection - Sherwin - Williams, Chicago, Illinois

FROM: Michelle Farley M.M. Farley
Environmental Engineer

TO: Files

031600AHO

Thru George Czerniak, Chief
Compliance Section I

Inspection Date: March 2, 1988

Attendees: Michelle Farley - Environmental Engineer, U.S. EPA
Robert Martin - Director of Environmental Services, Sherwin - Williams
Victor Barr - Plant Manager, Paint Facility
Bill Lukes - Plant Manager, Resin Facility
Bill Perry - Plant Manager, Emulsion Plant
Jerry Kamissky - Plant Personnel, Emulsion Plant

Purpose: The purpose of the inspection was to determine the compliance status of the facility as part of the FY 1988 VOC workplan.

Company Description and Background

Sherwin - Williams, located at 11541 S. Champlain, Chicago (SE Side), is primarily a solvent paint, and resin manufacturing facility. They also have an Emulsion plant, located at 117th & Cottage Grove, which manufactures water-based coatings. Sherwin - Williams no longer operates its Lacquer Manufacturing Plant and its container Manufacturing and Coating Plant.

Paint Manufacturing

The paint manufacturing operation, started in 1968, consists of adding solvent and pigment to a resin binder, and thinning the substance.

The raw materials to this operation consist of three components; the resin, the pigment, and the solvent. The resins are manufactured in the Resins facility, which will be discussed in a later section of this report. The pigments give the paint its color. These pigments may consist of chromates or titanium dioxide. Sherwin - Williams uses approximately 1800 different types of pigments. Also, Sherwin - Williams no longer uses lead pigment. They also use a variety of solvents, including toluene, xylene, methyl ethyl ketone (MEK), and aromatics. These solvents are stored in tanks in a tank farm, and are pumped in from the tank farm to both the paint plant and the resin plant.

The operation begins by grinding the pigments into a very fine powder. This is done in the mills and the high speed dispersers. The solvents are pumped into the mills and a paste is formed. The resins are added in the mixing tanks. In the mixing tanks, the final paste mixture containing pigment, resin, and solvent, is formed. From here, the paste is dropped to the thinning and shading tanks. All milling and mixing is done under ambient conditions. In the thinning and shading tanks, the final color is obtained by adding more pigment, and the final consistency of the paint is obtained by adding more solvent.

After the thinning and shading tanks, the product is pumped to the filling department. Three sizes of containers are filled with paints; 5 gallon pails, 55 gallon drums, or 350 gallon tanks. Most of the filling is done automatically, although some is done by hand. In 1987, approximately 8 million gallons of paint were produced. The final product is sent by conveyer to the storage and distribution warehouse.

The emissions from this operation consist of organics and particulates. The particulate emissions emanate from the mills and the mixers. These emissions are controlled by either a Wheelabrator dust collector or a Torit dust collector, as shown in the attached flow diagram (Attachment II). One side of the plant goes to the Wheelabrator dust collector and the other side to the Torit dust collector. The Wheelabrator (dry dust collector) is a baghouse type system. The pressure drop in the baghouse was estimated at 9 inches water, and the efficiency at 87%. The Torit (wet dust collector) is a filter type system. The pressure drop in the Torit was estimated at 3 inches water, and the efficiency at 99.9%. Plant personnel said that they change the filters in the Torit dust collector once a year. There were no visible emissions escaping either baghouse stack.

Sherwin - Williams has applied for construction permits to replace the Wheelabrator baghouse with a Torit dust collector. This should take place some time in November, 1988.

The organic emissions emanate from the mixing tanks, along with the particulate emissions from these units. This entire stream is vented, as described previously, to the dust collectors. The volatile organic emissions are uncontrolled.

Resin Manufacturing

The resin manufacturing process consists of two types of units; the reactors, and the thinning tanks.

There are ten operating reactors; R1-R3, R4, and K1-K6. Most of the reactors were constructed in the 1940's, 50's and 60's, except for R4, which was constructed in 1983. Reactors R1-R3 are steam heated reactors, operating at approximately 320°F. Raw materials consisting of vegetable oil, monomers, organic solvents, and other materials, are the feed to these reactors. The product is an acrylic type polymer. Reactor R4

can either be steam heated or hot oil heated depending on the reaction taking place. If the reactor is hot oil heated, the temperature of the reactor is approximately 450°F. Reactors K1-K6 are all hot oil heated, operating at a temperature of 450°F. The only difference is that reactors K1-K6 produce a polyester type resin. Most of the solvents added to the reactors consists of alcohols, toluene, and xylene. All reactors in this process are equipped with pressure relief valves.

From the reactors, the resin material is pumped to the prefilling and thinning tanks, where it is cooled and thinned with solvent. Reactors R1-R3 share five thinning tanks, Reactor R4 has two dedicated tanks, and Reactors K1-K6 each have their own thinning tanks. From the thinning tanks, the resin material is sent through filter presses, then put into either 55 gallon drums or storage tanks. Sherwin-Williams produces approximately 50 million pounds of resin per year.

The emissions from the process consist primarily of volatile organics, which emanate from the reactors and the thinning tanks. Reactors R1-R3 each have a condenser controlling organic emissions. These condensers are shell and tube type condensers, and the temperature in the condenser is such that the condensate is at 120°F. The condensate is sent to a separator and recycled back to the reactors. Reactor R4 vents into one of two condensers, depending on whether the reactor is being steam heated or hot oil heated. The condensers operate similar to those previously described (R1-R3). The condensate at 120°F is sent through a separator, and the solvent is pumped back to the reactor. Reactor K1-K6 each vent to their own condensers. They are shell and tube condensers, and operated such that the condensate is at 140°F. The condensate goes to a receiver, which in turn, pumps the solvent back to the reactors. All reactor condensers are vented to the atmosphere.

Each thinning tank in the process is also controlled by a condenser. They are shell and tube condensers, condensing the solvent, and recycling it back to the thinning tank.

Tank Farm

The solvent storage tanks are situated in a concrete enclosure. The input/output data was not obtained during the inspection. Complete data regarding the storage tanks will be included in the "114" response. At that time, a more complete evaluation will be conducted.

Emulsion Plant

The emulsion plant, located at 117th & Cottage Grove Avenue, produces water-based (latex) coatings, such as house paint.

The emulsion plant consists of two processes; grinding, and thinning & shading. The raw material, a clay substance, is ground to superfine particles in the high speed dispersers. The material is then sent to the thin and shade tanks, where the various ingredients of the coating, including water and titanium dioxide (TiO_2), are added to the powder. This final product is dispensed into containers and shipped.

The emissions from this process, particulates, emanate from the high speed dispersers. Vents above the high speed dispersers exhaust emissions to a dust collection system. The dust collection system is a two chamber bag-house. There are approximately 396 bags which are cleaned by a shaker type mechanism. Plant personnel estimated the control system's operating conditions at 30,000 cfm and a pressure drop of 10 inches water. There were no visible emissions escaping the control system stack.

Applicable Regulations

All VOC emission sources are subject to IPCB Regulations Rule 205(f), which limits the emission of organic material from any emission source to 8 pounds per hour.

All particulate emission sources are subject to IPCB Regulations Rule 202(b) and Rule 203(b) which limits the emissions of particulate matter from existing emission sources.

Comments

Mr. Martin asked me to send him a copy of the APER forms that Sherwin-Williams had submitted in 1979 and 1980 to help him fill out the new APER forms as requested in the 2/11/88 114 request.

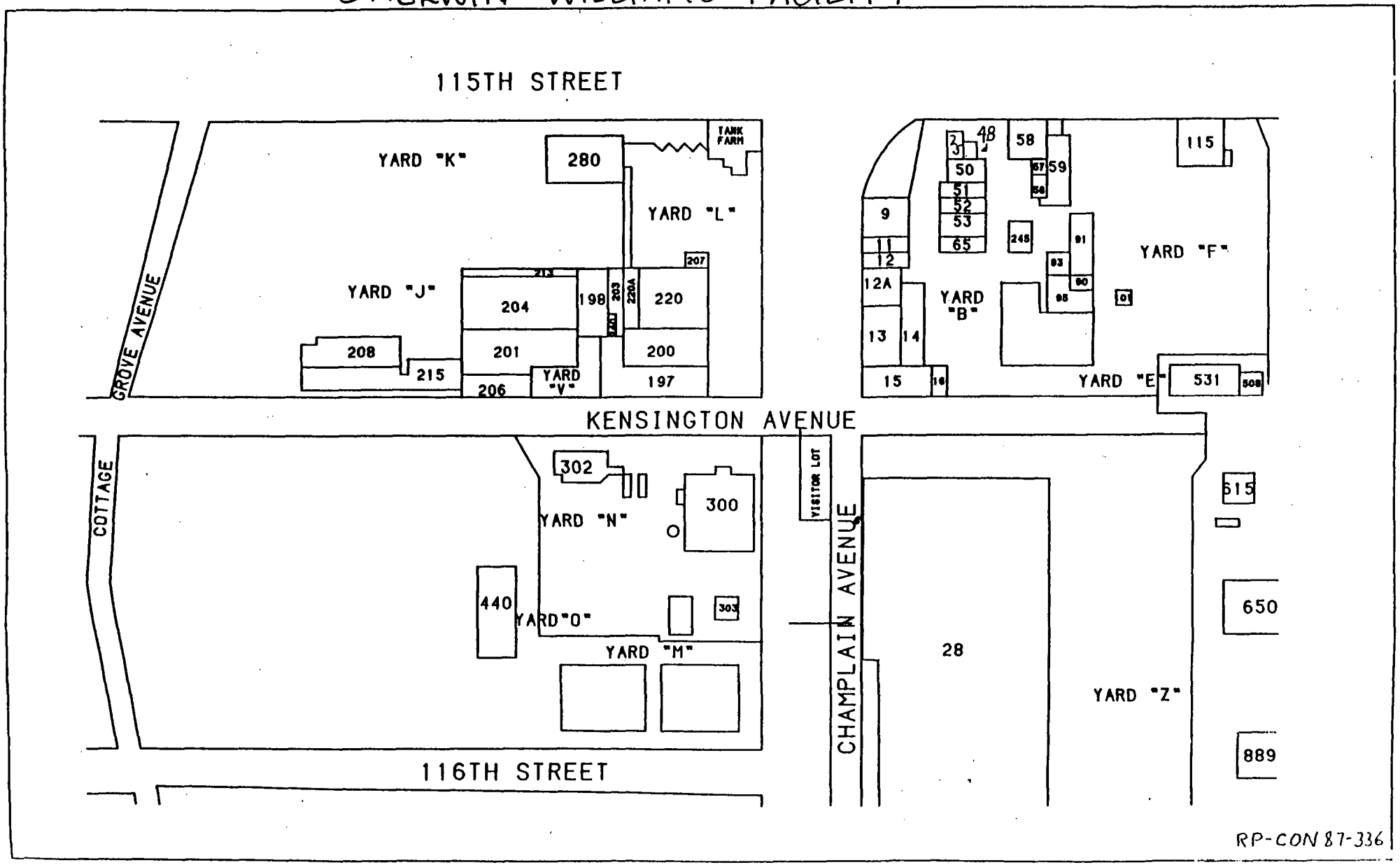
Attachments

standard bcc's: official file copy w/attachment(s)
originator's copy w/o attachment(s)
originating organization reading file w/o attachment(s)
ORA reading file w/o attachment(s)

other bcc's: Branch w/o attachment(s)
Penson
Johnson

5ARD:ACB:SECTION I:Disk Oriental:Plant Inspection Sherwin-Williams:Farley
ct:3/10/88

SHERWIN-WILLIAMS FACILITY



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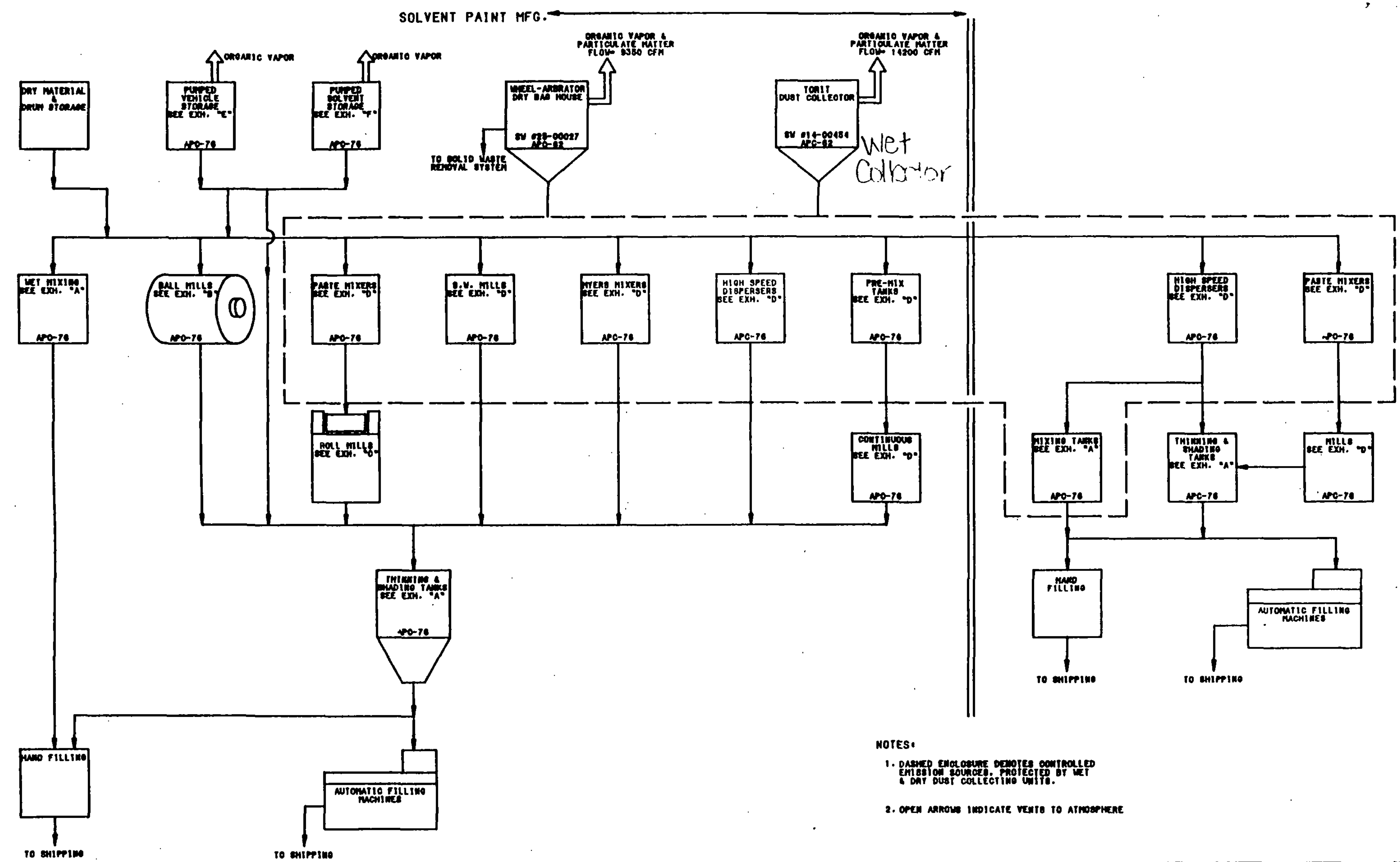
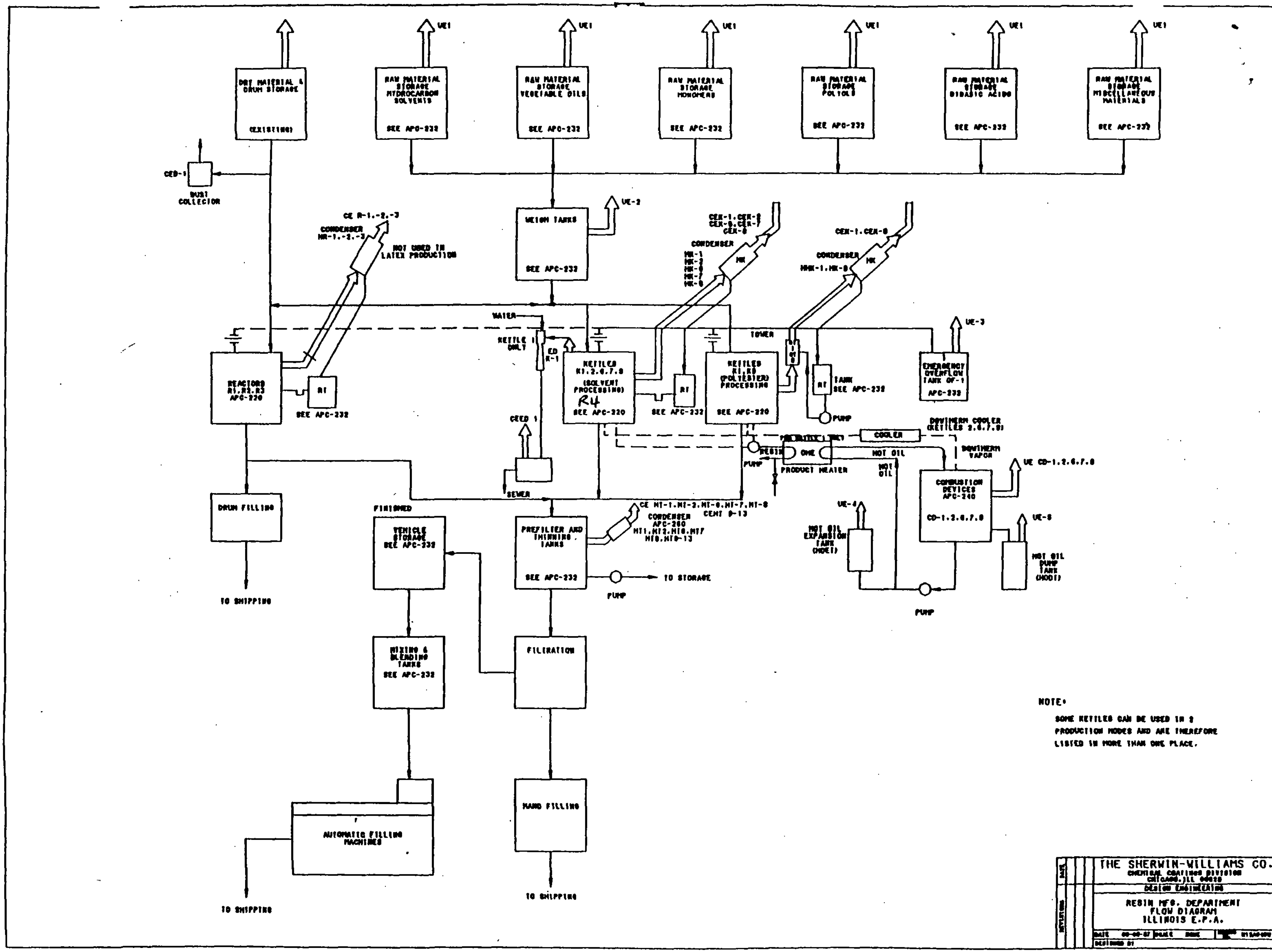


NOTES:

1. DASHED ENCLOSURE DENOTES CONTROLLED EMISSION SOURCES. PROTECTED BY WET & DRY DUST COLLECTING UNITS.

2. OPEN ARROWS INDICATE VENTS TO ATMOSPHERE

DATE				THE SHERWIN-WILLIAMS CO. CHEMICAL COATINGS DIVISION CHICAGO, ILL 60628
				DESIGN ENGINEERING
REVISIONS				PAINT MFG. DEPARTMENT FLOW DIAGRAM ILLINOIS E.P.A.
				DATE 04-JAN-88 / SCALE NONE / [illegible] N81A01EP
				DESIGNED BY


DRY MATERIAL & DRUM STORAGE
(EXISTING)
RAW MATERIAL STORAGE HYDROCARBON SOLVENTS
SEE APC-232
RAW MATERIAL STORAGE VEGETABLE OILS
SEE APC-232
RAW MATERIAL STORAGE MONOMERS
SEE APC-232
RAW MATERIAL STORAGE POLYOLS
SEE APC-232
RAW MATERIAL STORAGE DIBASIC ACIDS
SEE APC-232
RAW MATERIAL STORAGE MISCELLANEOUS MATERIALS
SEE APC-232
UE1
CED-1
DUST COLLECTOR
WEIGH TANKS
SEE APC-232
UE-2
CE R-1,-2,-3
CONDENSER HR-1,-2,-3
NOT USED IN LATEX PRODUCTION
CONDENSER
HK
CEK-1,CEK-2
CEK-6,CEK-7
CEK-8
CEK-1,CEK-8
HHK-1,HK-8
WATER
KETTLE 1 ONLY
ED R-1
REACTORS R1,R2,R3
APC-220
RT
SEE APC-232
KETTLES K1,2,6,7,8
(SOLVENT PROCESSING)
R4
SEE APC-220
KETTLES K1,K8
(POLYESTER) PROCESSING
SEE APC-220
TOWER
TANK
SEE APC-232
PUMP
UE-3
EMERGENCY OVERFLOW TANK OF-1
APC-232
DOWTHERM COOLER (KETTLES 2,6,7,8)
COOLER
DOWTHERM VAPOR
RESIN
ONE
HOT OIL
PRODUCT HEATER
CEED 1
SEWER
COMBUSTION DEVICES APC-240
CD-1,2,6,7,8
UE CD-1,2,6,7,8
UE-4
HOT OIL EXPANSION TANK (HOET)
UE-5
HOT OIL PUMP TANK (HOPT)
PUMP
DRUM FILLING
TO SHIPPING
FINISHED
VEHICLE STORAGE
SEE APC-232
PREFILTER AND THINNING TANKS
SEE APC-232
TO STORAGE
CONDENSER APC-260
MIXING & BLENDING TANKS
SEE APC-232
FILTRATION
AUTOMATIC FILLING MACHINES
TO SHIPPING
HAND FILLING
TO SHIPPING
NOTE:
SOME KETTLES CAN BE USED IN 2 PRODUCTION MODES AND ARE THEREFORE LISTED IN MORE THAN ONE PLACE.
THE SHERWIN-WILLIAMS CO.
CHEMICAL COATINGS DIVISION
DESIGN ENGINEERING
RESIN MFG. DEPARTMENT
FLOW DIAGRAM
ILLINOIS E.P.A.
DATE
REVISIONS